Claims

1. A spacer for holding a number of elongated fuel rods (5) intended to be located in a nuclear plant, wherein the spacer (30) encloses a number of cells (31), which each has a longitudinal axis (x) and is arranged to receive a fuel rod (5) in such a way that the fuel rod extends in parallel with the longitudinal axis (x), each cell (31) is formed by a sleeve-like member (32), which has an upper edge (33) and a lower edge (34), the sleeve-like member (32) includes a number of abutment surfaces (35), which project inwardly towards the longitudinal axis (x) and extend substantially in parallel with the longitudinal axis (x) for abutment to the fuel rod (5) to be received in the cell (31), and the lower edge (34), seen transversely to the longitudinal axis (x), has a wave-like shape with wave peaks (36), which are aligned with a respective one of said abutment surfaces (35), and wave valleys (37) located between two adjacent ones of said abutment surfaces (37), characterised in that the upper edge (33), seen transversely to the longitudinal axis (x), has a wave-like shape with wave peaks (6), which are aligned with a respective one of said abutment surfaces (35), and with wave valleys (37) located between two adjacent ones of said abutment surfaces (37).

2. A spacer according to claim 1, characterised in that said elongated abutment surfaces (35) extend from the upper edge (33) to the lower edge (34).

3. A spacer according to any one of claims 1 and 2, characterised in that each sleeve-like member (32) includes at least four of said abutment surfaces (35).

4. A spacer according to any one of the preceding claims, characterised in that each of said abutment surfaces is formed by a respective ridge (35) projecting inwardly towards the longitudinal axis (x).

5. A spacer according to any one of the preceding claims, characterised in that the sleeve-like members (32) abut each other in the spacer (30) along a connection area extending in parallel to the longitudinal axis (x) between one of said wave valleys (37) of the upper edge (33) and one of said wave valleys (37) of the lower edge (34).

6. A spacer according to any one of the preceding claims, characterised in that the sleeve-like members (32) are permanently connected to each other by means of weld joints.

7. A spacer according to claims 5 and 6, characterised in that said weld joint includes an edge weld at said connection area at at least one of the upper edge (33) and the lower edge (34).

8. A spacer according to any one of the preceding claims, characterised in that substantially each sleeve-like member (32) is manufactured in a sheet-shaped material (60) that is bent to the sleeve-like shape.

9. A spacer according to claim 8, characterised in that the sheet-shaped material (60) before said bending has a first connection portion (61) in the proximity of the a first end of the sheet-shaped material (60) and a second connection portion (62) in the proximity of a second end of the sheet-shaped material (60), wherein the first end overlaps the second end of the sleeve-like member (32) after said bending.

10. A spacer according to claim 8, characterised in that the first connection portion (61) and the second connection portion (62) are permanently connected to each other by means of at least one weld joint.

11. A spacer according to claim 10, characterised in that said weld joint includes a spot weld (63).

12. A spacer according to any one of claims 1 to 7, characterised in that substantially each sleeve-like member (32) is manufactured

from a tubular material which is worked to the wave-shaped shape of the upper edge (33) and the lower edge (34).

13. A spacer according to any one of the preceding claims, characterised in that the sleeve-like member (32) seen in the direction of the longitudinal axis (x) has four substantially orthogonal long sides (40), wherein each long side includes one of said abutment surfaces (35).

14. A spacer according to claim 13, characterised in that each long side (40) includes one of said wave peaks (36) of the upper edge (33) and one of said wave peaks of the lower edge (34).

15. A spacer according to any one of claims 13 and 14, characterised in that the sleeve-like member (32), seen in the direction of the longitudinal axis (x), has four substantially orthogonal short sides (41), wherein each short side connects two of said of long sides (40) and includes with a portion of one of said wave valleys (37) of the upper edge (33) and a portion of one said wave valleys (37) of the lower edge (34).

16. A spacer according to any one of the preceding claims, characterised in that the sleeve-like member (32) has a thickness of the material, which is less than 0.24 mm.

17. A spacer according to any one of the preceding claims, characterised in that the sleeve-like member (32) has a thickness of the material, which is less than or equal to 0.20 mm.

18. A spacer according to any one of the preceding claims, characterised in that the sleeve-like member (32) has a thickness of the material, which is less than or equal to 0.18 mm.

19. A spacer a according to any one of the preceding claims the nuclear plant is arranged to permit re-circulation of a coolant flow and wherein the spacer (3) is arranged to be located in the coolant flow, characterised in that the spacer (30) include at least one vane (79) for influencing the coolant flow.

20. A spacer according to claims 9 and 19, characterised in that said vane (70) is formed by a portion (64) of the material, which extends from the first connection portion (61).

21. A spacer according to any one of claims 19 and 20, characterised in that the sleeve-like member (32) includes a slit (71), which extends from at least one of the upper edge (33) and lower edge (34) and which permits outward bending of a part of the sleeve-like member (32) for forming said vane (70).

22. A spacer according to any one of claims 20 and 21, characterised in that said vane (70) is inclined in relation to the longitudinal axis (x).

23. A spacer according to at least claims 13 and 19, characterised in that said vane (70) extends outwardly form one of said long sides (40).

24. A spacer according to any one of the preceding claims, characterised in that the spacer (30), seen in the direction of the longitudinal axis (x), has a substantially rectangular shape and includes at least two separate outer edge elements (50) which extend along a respective side of the spacer (30).

25. A spacer according to claim 24, characterised in that one of the four corners of the rectangular shape is reduced through the lack of outer sleeve-like member (32), and that the spacer (30) includes a separate inner edge element (51), which extends along two of said sides and along said reduced corner.

26. A spacer according to claim 25, characterised in that the inner edge element (51) includes a vane (53), which is located at said reduced corner and which is inclined upwardly and inwardly towards a centre of the spacer (30).

27. A fuel unit for a nuclear plant including a number of elongated fuel rods (5) and a number of spacers (30) for holding the fuel rods, wherein

the spacers (30) enclose a number of cells (31), which each has a longitudinal axis (x) and is arranged to receive one of said fuel rods (5) in such a way that the fuel rod extends in parallel to the longitudinal axis (x),

each cell (31) is formed by a sleeve-like member (32), which has an upper edge (33) and a lower edge (34),

the sleeve-like member (32) includes a number of elongated abutment surfaces (35), which project inwardly towards the longitudinal axis (x) and extend substantially in parallel with the longitudinal axis (x) for abutment to the fuel rod (5) to be received in the cell (31), and

the lower edge (34), seen transversely to the longitudinal axis (x), has a wave-like shape with wave peaks (36), which are aligned with a respective one of said abutment surfaces (35), and wave valleys (37) located between two adjacent ones of said abutment surfaces (37),

characterised in that the upper edge (33), seen transversely to the longitudinal axis (x), has a wave-like shape with wave peaks (6), which are aligned with a respective one of said abutment surfaces (35), and with wave valleys (37) located between two adjacent ones of said abutment surfaces (37).